WOLVERINE HARVEST
AND CARCASS COLLECTION
COPPERMINE, BAY CHIMO, AND
BATHURST INLET, 1993/94

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WOLVERINE HARVEST AND CARCASS COLLECTION COPPERMINE, BAY CHIMO, AND BATHURST INLET, 1993/94

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ABSTRACT

We processed 80 wolverine carcasses contributed by hunters from Coppermine, Bay Chimo, and Bathurst Inlet during the 1993/94 wolverine hunting season. Two additional wolverines were reported killed but carcasses were not submitted. The harvest was clumped in 2 areas: southwest of Coppermine toward Dismal Lakes and in the Bathurst Inlet area. Sex ratio of the harvest was 2:1 (m:f) with juvenile and yearling males predominating. Eighty one percent of the animals taken were shot. All adult females were pregnant. Juvenile males had the highest fat measures of all age and sex groups. Caribou occurred in 83% of the stomachs examined, about 10 times more frequently than other food items. The carcass collection program will continue in 1994/95.

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INTRODUCTION

In the fall of 1992 the Department of Renewable Resources initiated a wolverine carcass and harvest data collection program in Coppermine, Bay Chimo, and Bathurst Inlet (Lee, 1994). There are indications that the number of wolverine pelts appearing on the fur market under-estimate the NWT harvest by 50 to 90% (K. Poole, pers comm). Large numbers of pelts are used locally and the actual harvest is unknown. The current collection of wolverine carcasses and hunter kill information is an attempt to better estimate the total harvest in the mainland Kitikmeot region, to monitor the age and sex of the harvest, and to explore wolverine reproductive status and physical condition. This paper reports the results of the second season of the harvest collection, 1993/94.

METHODS

With the assistance of Department of Renewable Resources (DRR) officers in Coppermine and Cambridge Bay, and Gwen and Joseph Tikhak in Bay Chimo, wolverine carcasses were obtained from hunters and shipped to Coppermine and Yellowknife for examination. Hunters received $25/carcass and answered basic questions about their harvest to allow a short data form to be completed.

Carcass measurements included carcass weight, body length from nose to base of tail, chest girth, condylo-basal length, and zygomatic width. Sex and reproductive condition of females (number of corpora lutea) were also noted. A female with corpora lutea or macro pregnant was considered pregnant (Banci and Harestad 1988).

An estimated body weight was calculated by subtracting the weight of the stomach contents from the carcass weight and adding 100g/paw to the carcass weight for animals with missing paws. This weight was further adjusted for the weight of the fresh hide: an additional 19% of carcass weight for females and 23% for males (Gunn and Lee in prep.).

Perirenal fat and sternal fat deposits were removed from the carcasses and weighed. The depth of back fat was measured in situ. Although collected in previous years, depth of inguinal fat was dropped from the data collection this year because of the considerable measurement variability based on the condition of the carcass. Weights of perirenal and sternal fat were indexed to body size to provide a fat index: fat index = 100 * (weight of perirenal fat + weight of sternal fat) / (carcass weight - stomach contents weight).

Stomach contents were examined by washing them over a sieve and identifying bones, fur, feathers and other ingesta. Age was determined by cementum aging of a lower canine. The ratio of canine pulp cavity width to tooth width (Poole et al. 1994) was used to age animals in their first year. Wolverines in their first year were classified as juveniles, as yearlings in their second, and as adults if they were 2 or older.

Where comparisons were made between years, values used for a previous year at times differed slightly from those reported in prior harvest reports because of acquisition of additional information or specimens. Statistical differences in distributions were examined with Chi Square and the influence of sex, age, and time of harvest were examined with analysis of variance and least square means; differences were considered significant at the 0.05 probability level.

RESULTS and DISCUSSION

Eighty two wolverines were reported harvested over the 1993/94 season (Fig.1, Table 1). Thirty two hunters from Coppermine, Bay Chimo, and Bathurst Inlet turned in 80 wolverine carcasses; 2 additional wolverines were reported taken, but no carcasses were submitted. There were a small number of other wolverines taken but these were not documented; 82 is therefore an underestimate.

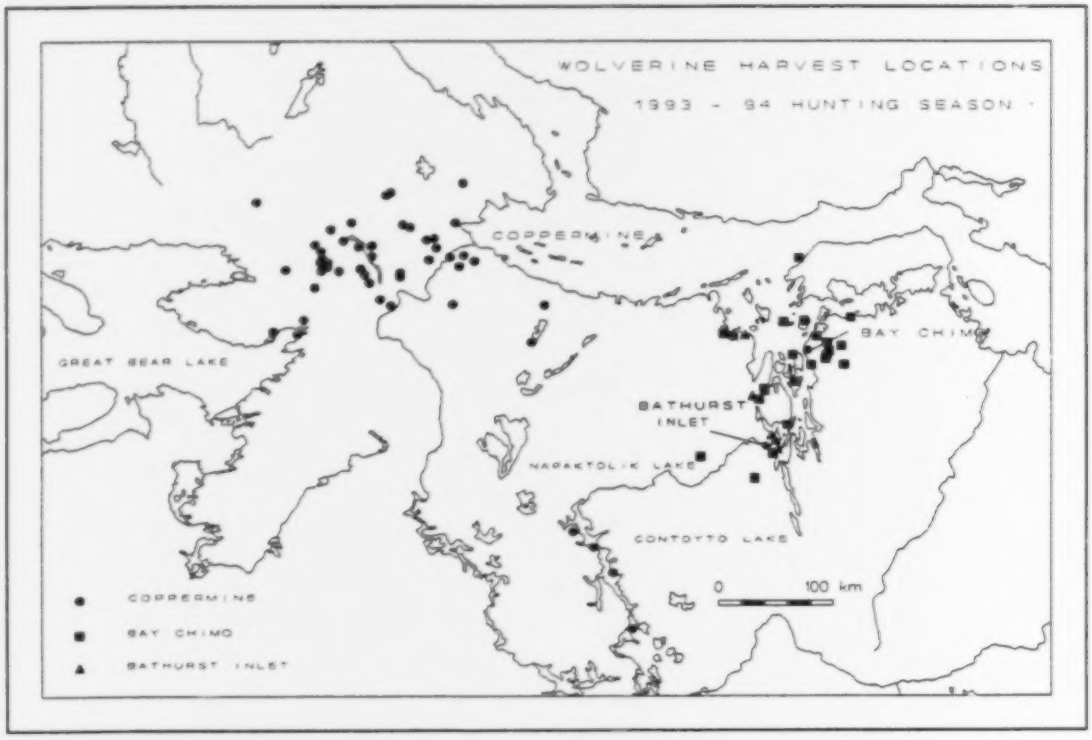

Figure 1. Locations of wolverines harvested by hunters from Coppermine, Bay Chimo, and Bathurst Inlet during the 1993/94 season

Coppermine hunters took 53 animals and Bay Chimo/Bathurst Inlet took 29. The same two hunters who accounted for 27% of the harvest in 92/93, again took the largest proportion of the

reported harvest (35%) (Table 2). In 92/93 the harvest was clumped in 3 areas: Dismal Lakes, Bathurst Inlet and Napaktolik Lake. This year because of poor travelling conditions early in the season, and the accessibility of caribou close to Coppermine, the Napaktolik Lake area was hunted lightly. There were no reported kills from that area. Other than the trail to Contwoyto Lake, the region between the Coppermine River and Bathurst Inlet does not appear to be travelled or hunted frequently. This results in a large lightly hunted area that could act as a refugia from which wolverines could disperse to re-populate hunted regions. Several wolverines were taken in the Contwoyto Lake area by the occasional hunter travelling to Lupin Mine or to outpost camps in that region.

Wolverines were reported harvested in a variety of ways: 3 were taken in leg hold traps, 12 in quick kill traps, 65 (81%) were shot, 1 was run over, and 1 killed with a snow knife. The proportion shot was similar to that reported last season.(Lee 1994).

Table 1. Total number, age, and sex of harvested wolverines.

	Males	Females	Unknown	Total
Adult	16	2	0	18
Yearling	22	13	0	35
Juvenile	17	8	0	25
Unknown	1	0	3	4
Total	56	23	3	82

Table 2. Distribution of wolverine harvest among hunters.

Number of wolverines	1	2	3	4	11	18
Number of hunters	16	6	7	1	1	1
Percent of harvest	20	15	26	5	13	22

The over all harvest was skewed toward males by approximately 2:1 (23 females, 56 males). The sex ratio of the 2 younger age classes combined was 1.8:1 (m:f) and significantly differed from 1:1 (P=0.02). The very low number of adult females in the harvest this season resulted in a largely skewed adult sex ratio of 8:1 (m:f).

All age classes were represented in the harvest: juveniles 32.1%, yearlings 44.8%, and adults 23.1% (n=78) but the distribution was not different from a 1:1:1 ratio (Chi sq=5.62,df=2,p=0.06). Neither was the male age distribution different from the female (Chi sq=3.99,df=2,p=0.137). Ninety one percent of the female harvest and 70% of the male harvest was composed of animals less than 2 years old. Harvests weighted toward younger animals are common with mustelids (Buskirk and Lindstedt 1989). A preponderance of young animals in the harvest would seem to be desirable, indicating perhaps that the younger, more abundant, less productive segment of the population was being harvested. It could also indicate that there is a movement of dispersing young animals into the harvest area. Both the harvest areas have been hunted consistently for at least 10 years and the harvests were relatively local. Consequently, I would suspect many of the resident adults were harvested over the years and most of the yearling wolverines taken are immigrants. The paucity of adult females in the 1993/94 harvest (2.6% of total harvest) deviates from the proportion seen in

previous years where data is available, being about 20% of previous values. The reasons for this change in the age distribution and its implications are unclear.

After reviewing available literature, Hatler (1989) concluded "the best relative measure of recruitment is likely to be the proportion of young animals in the harvest". To document possible trends in the Kitikmeot harvest, percent juveniles, percent animals age<2 and percent adult females are summarized in Fig 2.

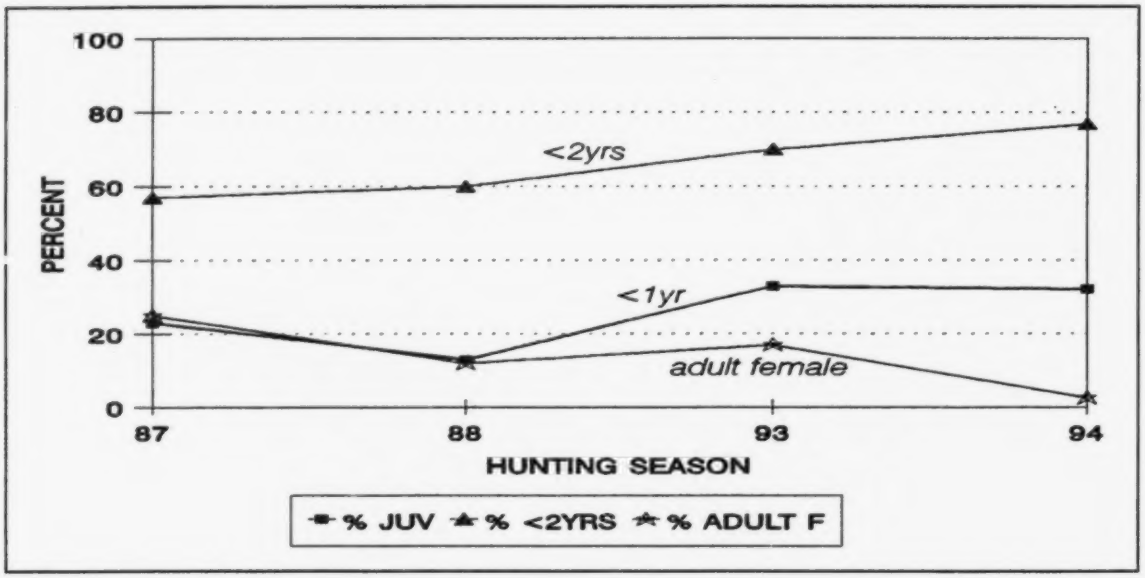

Figure 2. Composition of wolverine harvest from recent years where age and sex data was available.

Wolverines were harvested in all months (Fig 3) between 1 November 1993 and 30 April 1994 with the peak being in December and January. Similar to the 1992/93 season, the percent of juveniles in the monthly harvest started off low in November and gradually increased (Fig 4). Yearlings were the dominant age group in most months. Samples were too small to break down monthly by sex. The oldest wolverine killed was a 10 year old male taken north of Dismal Lakes.

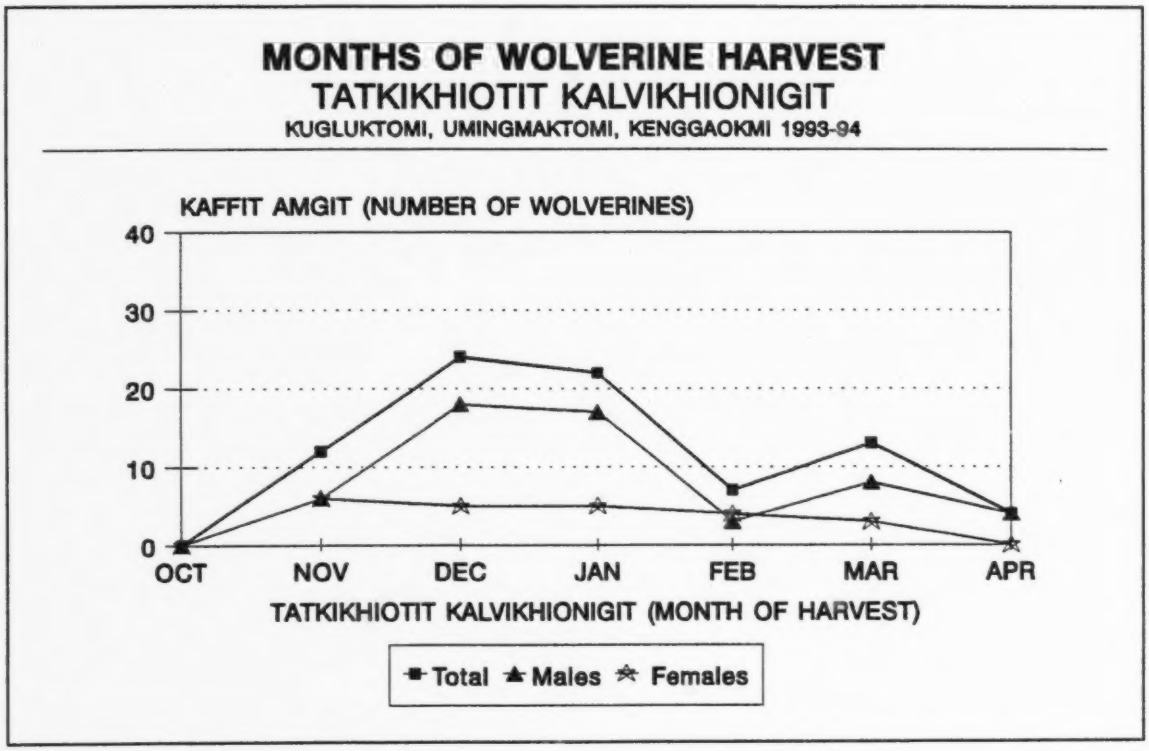

Figure 3. Months that wolverines were harvested by hunters from Coppermine, Bay Chimo, and Bathurst Inlet during the 1993/94 season.

Both of the adult females harvested were pregnant. These animals were killed in the Bay Chimo area at the end of January and both had detectable but unmeasurable fetuses. Given that the period of gestation after implantation is 30 to 40 days (Mead and Wright 1983), these females would have given birth in mid March. In contrast to 1992/93 when adult females were taken in varying numbers throughout the season, January was the only month in 1993/94 where adult females occurred. No yearlings or juveniles had corpora lutea or were macro pregnant. The average fetal litter size was 4.5 (n=2).

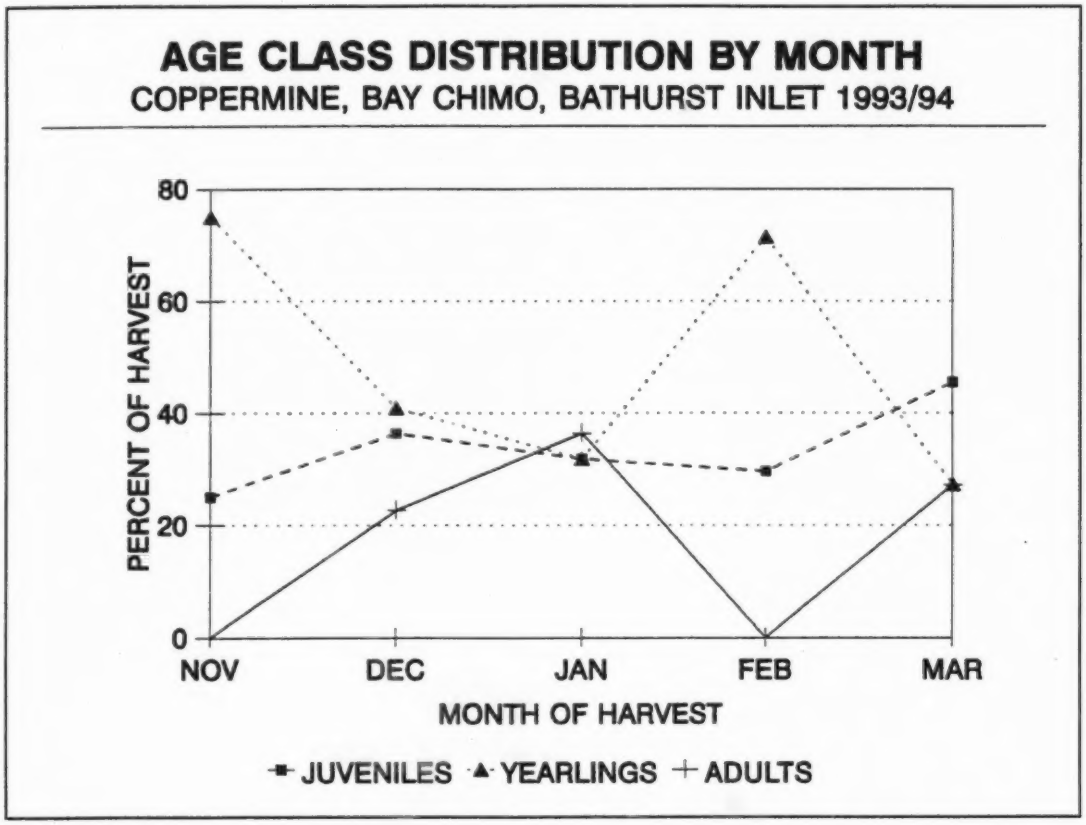

Figure 4. Monthly distribution of wolverine age classes occurring in the harvest. Only months with samples of 5 or more are presented.

Although mean juvenile body measures were slightly less than adults, there were no significant differences among age classes. Wolverines grow quickly and are close to adult size by November. However, as expected with a species known to exhibit sexual dimorphism, males were routinely larger than females (Table 3). The mean estimated body weight of females, (9.5kg n=23) was significantly ($P<0.01$) less than that of males (14.9kg n=54). The largest male weighed 20.0kg and the largest female was 10.9kg.

All of the wolverines that were shot had measurable fat deposits (Table 4). Although juvenile males showed the highest fat measures of all age/sex groups for all fat depots, the difference was not

significant. All measures of internal fat (sternal and perirenal) increased from November to

Table 3. Mean body measurements of harvested wolverines.

	Estimated Body Weight (kg)	Body Length (mm)	Chest Girth (mm)	Condylo-basal (mm)	Zygomatic (mm)
Males	14.9	849	427	149	107
Females	9.5	763	390	137	96

December then slowly decreased through to March (Fig 5). There was no significant difference among months for any fat measures. The fat index for all groups was slightly higher than that reported in 1992/93. Pond et al (1994) concluded that indices based on thickness or mass of fat deposits would not provide an accurate estimate of a wolverine's fatness. However, the degree of change in one or several deposits over the year or between years may reflect current environmental conditions for wolverines.

Table 4. Mean measurements of fat depots on harvested wolverines.

MALES				
EXTERNAL FAT MEASURES		INTERNAL FAT MEASURES		
AGE	BACK FAT mm	STERNAL gm	KIDNEY gm	BODY FAT INDEX
ADULT	3.8 n=12	30.3 n=9	26.1 n=11	4.21 n=8
YEARLING	5.3 n=17	29.5 n=15	32.6 n=14	4.98 n=12
JUVENILE	5.9 n=16	43.9 n=15	44.3 n=15	7.62 n=14
FEMALE				
EXTERNAL FAT MEASURES		INTERNAL FAT MEASURES		
ADULT	4.0 n=1	20.7 n=1	27.3 n=1	5.96 n=1
YEARLING	4.0 n=7	15.8 n=7	18.4 n=8	4.32 n=7
JUVENILE	2.9 n=7	22.3 n=6	31.2 n=7	6.76 n=5

Of 73 stomachs examined from wolverines shot or otherwise killed quickly, 55 contained some food items and 18 (24.6%) were empty. In stomachs that were not empty, caribou (*Rangifer tarandus*) occurred in 83%. Microtines (voles, lemmings) were found in 2 stomachs, fish in 2, muskox (*Ovibus moschatus*) in 5, ground squirrels (*Spermaphilus parryii*) in 2, arctic fox (*Alopex lagopus*) in 2, ptarmigan in 1, and 2 contained only fluid. The frequency of caribou was the same as last season, suggesting that to wolverines, caribou accessibility was similar both years. Caribou are present year round in the area between Great Bear Lake and Bathurst Inlet. In arctic Alaska, Magoun (1987) found cached arctic ground squirrels to be an important part of the winter diet. On mainland Kitikmeot, this is not the case because of the availability of caribou carrion during the winter. Also,

wolverine may be more of a caribou predator than expected. Hunters from the collection area periodically report observing tracks or incidents where wolverine have hunted and killed caribou. The contents of one stomach, which was crammed full of caribou, weighed 1.7kg.

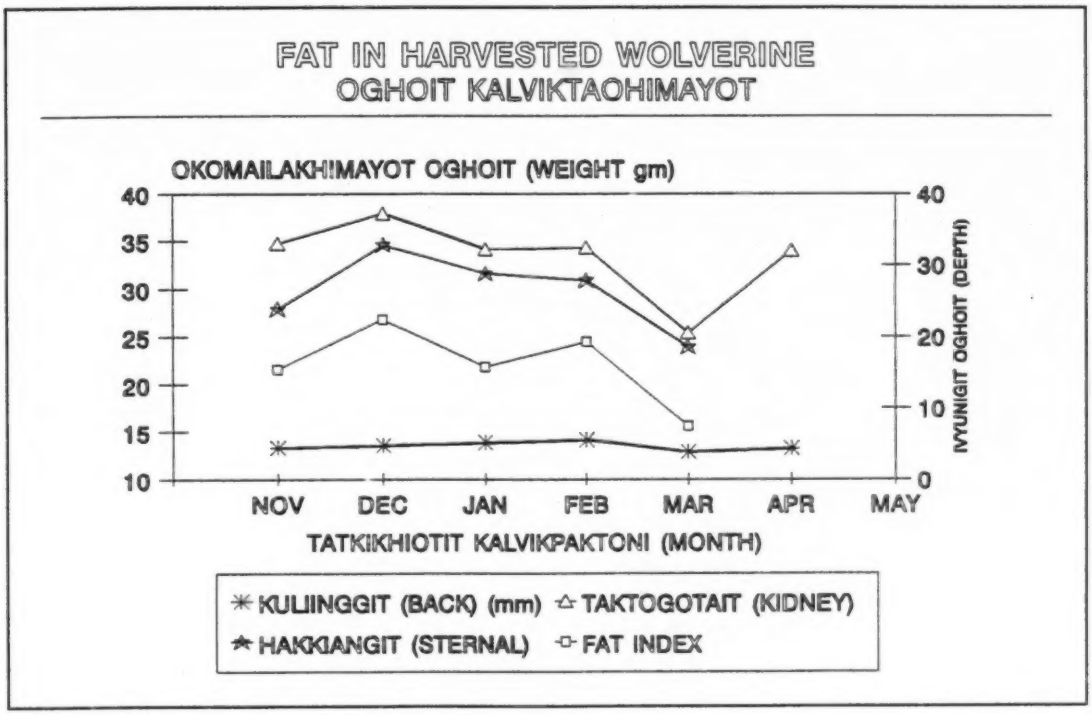

Figure 5. Mean fat measures of harvested wolverines over the period 1 November 1993 to 30 April 1994. All months had sample sizes of 5 or more for all fat measures. The fat index was adjusted by a factor of 2 for graphing convenience.

The collection of harvest data cannot be relied upon to accurately reflect the age and sex structure of the population. There can be many biasses in data collection and the data probably more realistically reflects vulnerabilities of different age and sex classes to harvest. However, data such as percent adult females and number of juveniles in the harvest may provide some insight in the

reproductive status of the population. Additionally, patterns in harvest success, kill locations, and total numbers have potential to provide feedback for management changes. In the absence of ecological data from research studies, continued collection of carcasses and harvest data provide a window into wolverine biology.

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